

Implications of aphasia on abstract and concrete noun processing

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Background

There is evidence that concrete and abstract nouns are processed differently. Concrete nouns are generally processed faster and more accurately (the ‘concreteness effect’), possibly because they activate meaning representations in more widespread brain areas, including posterior sensory cortices, whereas abstract noun processing, which can be assumed to be more dependent on linguistic context, more exclusively involves left hemisphere perisylvian areas.

Aims

This study examines the processing of abstract and concrete nouns in aphasic subjects with the goal of obtaining insights into how the meaning representations of these two word categories are structured cognitively. Whereas left perisylvian lesions were hypothesized to implicate a greater impairment in abstract noun processing as a result of difficulties accessing linguistic context, left occipital lesions were expected to cause problems processing concrete words due to damage to cortex involved in processing of visually related semantic features.

Methods

Four native Swedish speakers diagnosed with aphasia, two with left hemisphere frontoparietal lesions, one with left hemisphere temporoparietal lesions, and one with left hemisphere occipital lesions, participated in the study. The accuracy and speed of concrete and abstract noun processing were measured with a multiple-choice test and a word association test. Multiple-choice test scores and verbal association access times were compared with those from twelve healthy controls. Some qualitative analysis of the word associations was also performed.

Results

Whereas a pronounced concreteness effect was found in the aphasic participants with frontoparietal and temporoparietal lesions, signs of a reverse concreteness effect were observed in the participant with occipital lesions.

Conclusions

The results of the present study offer support for models that assume that abstract noun processing is more exclusively dependent on linguistic representations in the left perisylvian network, whereas sensory representations in posterior cortices also are intimately involved in concrete noun processing. Difficulties retrieving linguistic context may result in a greater reliance on emotional and episodic memory representations in abstract noun processing. Results from the subject with occipital lesions are similar to findings from studies of patients with visual-verbal disconnection

syndromes, despite the fact that only verbal, one-word stimuli were used, further emphasizing the importance of visual feature representations in the occipital cortex for the processing of concrete nouns.

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